

**Activity** 

Episode 4 24<sup>th</sup> February 2015

# Solar Energy

# **Key Learning**

Students will investigate how energy from the sun can be used to generate electricity. Students will explore the advantages and disadvantages of solar energy, from environmental, economic and social perspectives.

## The Australian Curriculum

Science / Science Understanding / Physical sciences

Energy from a variety of sources can be used to generate electricity (ACSSU219) Year 6





Science / Science as a Human Endeavour / Use and influence of science

Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (ACSHE135) Year 8







Science / Science Understanding / Earth and space sciences

Some of Earth's resources are renewable, but others are non-renewable (ACSSU116) Year 7





Science / Science as a Human Endeavour / Nature and development of science

Important contributions to the advancement of science have been made by people from a range of cultures (ACSHE099)





# **Discussion Questions**

- 1. Briefly summarise the Solar Energy story.
- 2. Working in pairs, record what you learnt about photons.
- 3. Which chemical element is used to make solar panels?
- 4. The flow of electrons through a solar panel is called
- 5. Solar power is a non-renewable energy. True or false?
- 6. What are the benefits of using solar energy?
- 7. What are the disadvantages?
- 8. Where in Australia are they going to build a solar farm?
- 9. How many homes will it power?
- 10. Do you think more people in Australia should install solar panels? Why or why not?

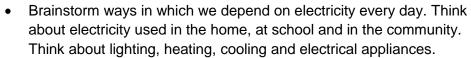


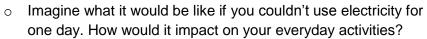
## **Activities**

Negotiate with students how many activities they complete from each section.

#### Remember and understand

- Solar energy quiz. Download the BtN *Solar Energy* transcript to help answer the following questions.
  - What is a photon? Explain using your own words. Using the internet find an interesting fact about photons.
  - What material is used in solar panels that help absorb the suns energy? Sulphur, silicon or carbon?
  - The flow of is what we call electricity.
  - In your own words describe the process whereby energy from the sun is captured and converted into electricity. Draw a simple diagram.





- Do you know where the electricity you use comes from?
  - Brainstorm renewable and non-renewable sources of energy (examples: coal, natural gas, oil, solar, wind and nuclear).
  - O Where does solar power come from?
  - o How is solar energy captured?



## Apply and analyse

- Have you ever imagined how much energy the sun outputs every day? Use the internet to help find answers to the following questions.
  - o How much energy (in kilowatts) does the sun output in one day?
  - What percentage of the sun's power actually reaches earth?
  - o How do we currently harvest energy from the sun?
- List the pros and cons of using solar energy.
  - o How does using solar energy impact on the environment?
  - o Does it produce carbon emissions?
  - Is it a renewable or non-renewable source of energy? Will we ever run out of solar energy?
  - o Is it expensive to build solar panels and solar farms?
  - o How much space do solar farms require?







- Is solar power a reliable source of energy? Think about weather and other geographical factors.
- Are solar farms safe for the people that work and live nearby?
- Is solar power a sustainable source of energy? Compare the pros and cons with other sources of energy.
- Use your research findings, to write a magazine article, news report or information report about solar energy. Share your research and opinions about solar energy on a class blog or wiki.
- What are the best locations for solar panels?
  - Why do you think a new solar farm is being built in Townsville, Queensland? Think about the weather and geography of Townsville.
  - Explore where other solar farms have been built around the world. Locate using Google Maps. Compare the geography of these places to Townsville. How are these places similar or different?
  - Have you ever considered that a solar farm could be built in space? Watch this video to find out more. http://splash.abc.net.au/media/-/m/29970/solar-power
  - What might affect how effective a solar panel is at harnessing solar energy?
    Consider the angle of the sun, whether there is rain, snow or hail, the amount of cloud cover or the amount of pollution in the air.

## Evaluate and create

- Explore Australia's energy future. What types of energy should Australia use? Use <a href="CSIRO's online tool">CSIRO's online tool</a> to get the best 'electricity mix' for Australia.
- Solar energy is the answer to future energy supplies. Why or why not? Organise a classroom debate.
  - Brainstorm the advantages and disadvantages of using solar energy.
  - o Reflection
    - How difficult was it to think of points to support one side of the argument?
    - Do you think you would have done a better job supporting the other side of the argument?
    - Was I able to convince others of my opinion?
    - Did my opinion change?
    - What did you learn from this activity?
- Watch this <u>TEDEd Lesson "Why aren't we only using solar power?"</u>
  - Explain the following terms using your own words – direct irradiance, diffuse irradiance and reflected irradiance.
  - As a class, go outside to investigate how clouds affect the sun's rays. Find examples of direct irradiance diffuse irradiance and reflected irradiance.
     Illustrate.





- Does your school have solar panels? If not, conduct a study and present it to your school.
  - o Research the benefits of using solar energy at your school.
  - Does your school have a plan to reduce its carbon footprint? If so, find out what your schools targets are in reducing its carbon emissions. Would installing solar panels reduce your schools carbon emissions? Explain.
  - Where would the solar panels be located? Is part of your schools roof north facing and free from shade between 9am and 3pm? Is the roof strong enough to support the solar panels? Contact your school grounds person to find out more.

## Related Research Links

Behind the News – Solar Future http://www.abc.net.au/btn/story/s3820130.htm

ABC Rural - Approval for Australia's largest solar farm to be built in Queensland <a href="http://www.abc.net.au/news/2015-02-12/queensland-to-house-australias-largest-solar-farm/6089286">http://www.abc.net.au/news/2015-02-12/queensland-to-house-australias-largest-solar-farm/6089286</a>

Future Sparks - Solar Energy

http://futuresparks.org.au/inspiration/all-about-energy/solar-energy.aspx

Energy Kids - Solar

http://www.eia.gov/kids/energy.cfm?page=solar\_home-basics

ABC Splash – Solar Power

http://splash.abc.net.au/media?id=29970

TEDEd Lessons Worth Sharing – Why aren't we only using solar power? (video)

http://ed.ted.com/lessons/why-aren-t-we-only-using-solar-power-alexandros-george-charalambides

Global Education – Sustainable Energy Sources

http://www.globaleducation.edu.au/teaching-activity/sustainable-energy-sources-up.html

National Geographic Education – Solar energy

http://education.nationalgeographic.com.au/education/encyclopedia/solar-energy/?ar\_a=1

Cool Australia – Flipped Classroom: Why aren't we using solar power?

http://www.coolaustralia.org/activity/flipped-classroom-arent-using-solar-power/

Cool Australia – Energy Fact Sheet

http://coolaustralia.org/wp-content/uploads/2012/12/Energy-fact-sheet.pdf

